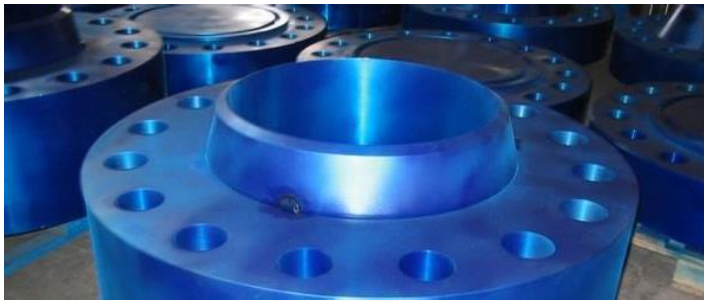


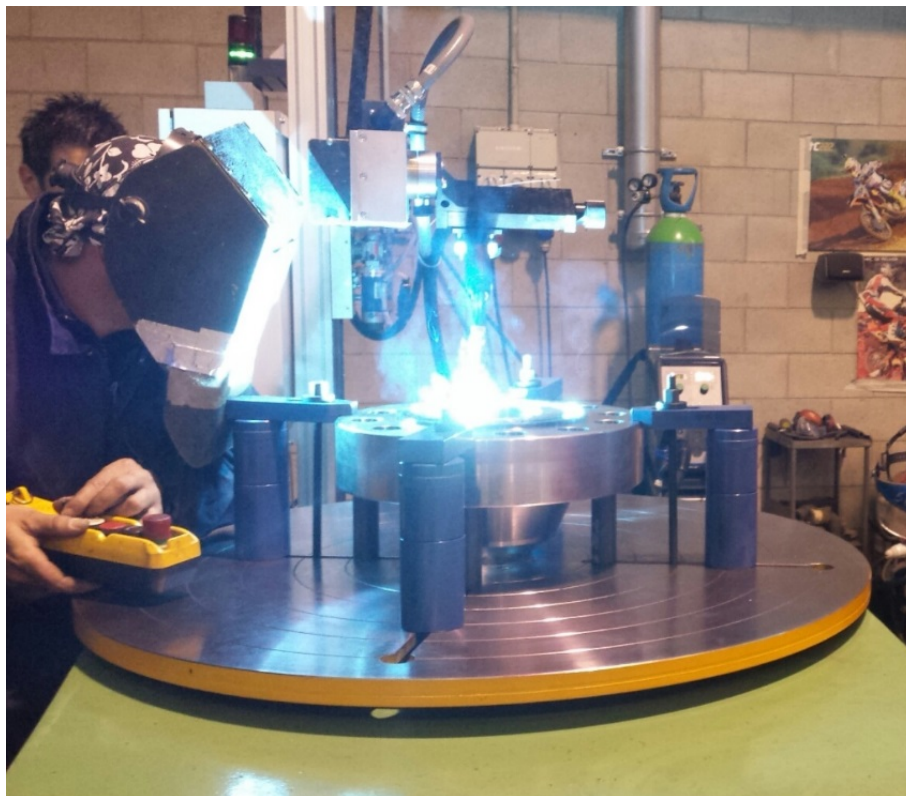
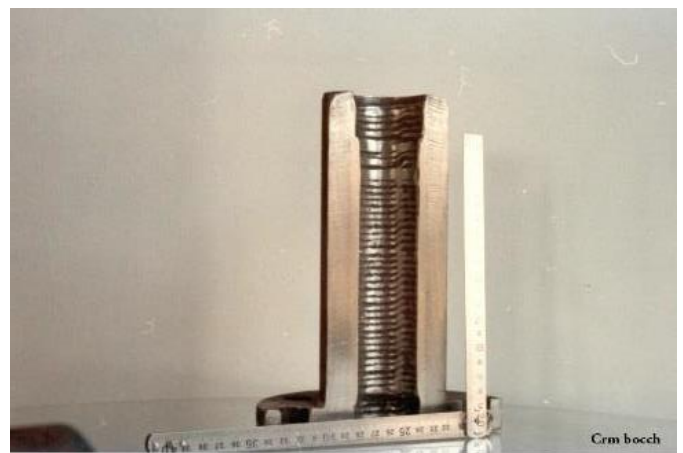
# FINISHED PRODUCTS



# FINISHED PRODUCTS



# WEALD OVERLAY



# SPECIAL ITEMS

## *BUNDLE / RISER BULKHEAD FORGINGS*

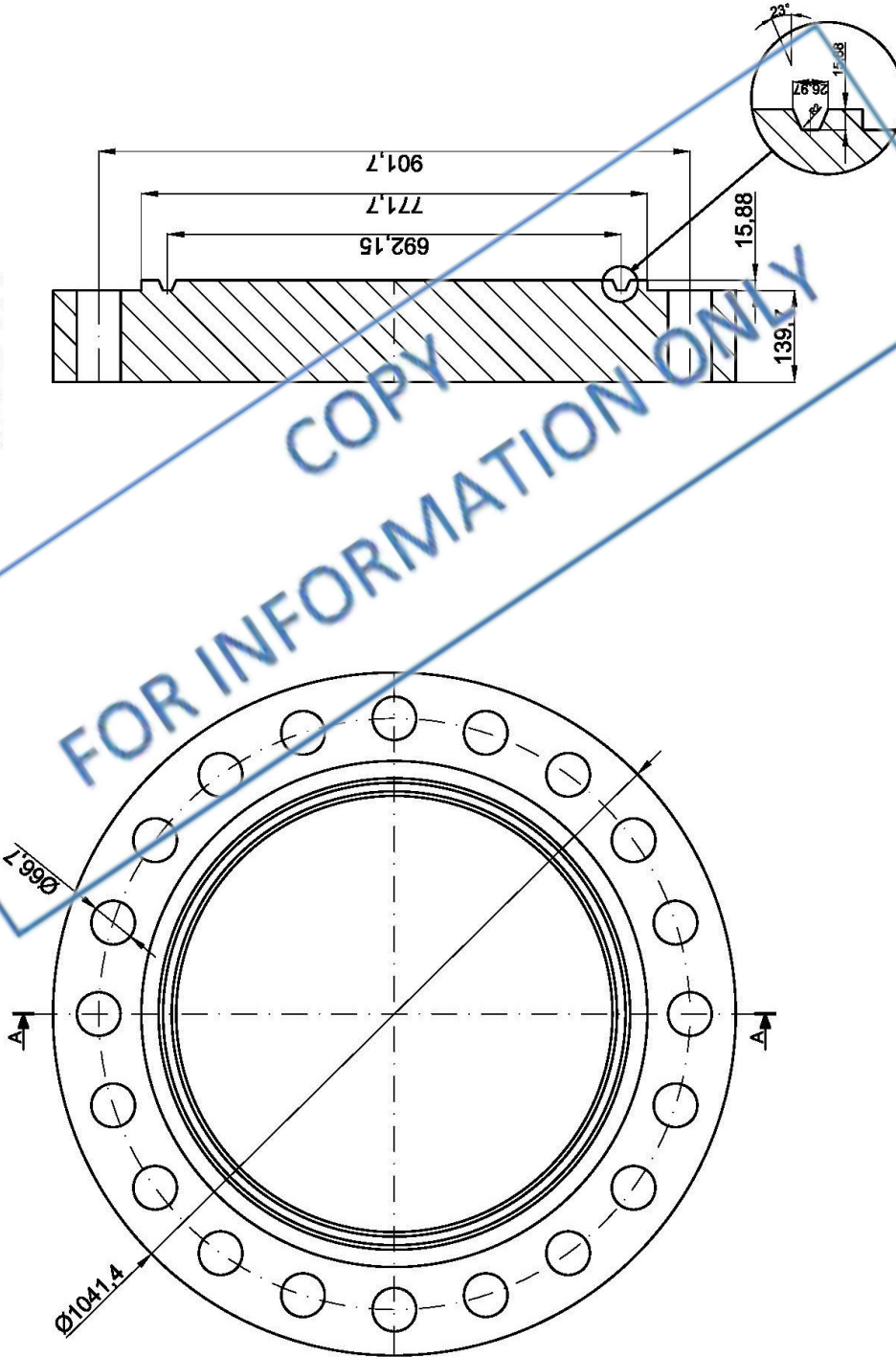


## *FABRICATED PIECES*



# SAMPLE DWG BLIND FLANGE

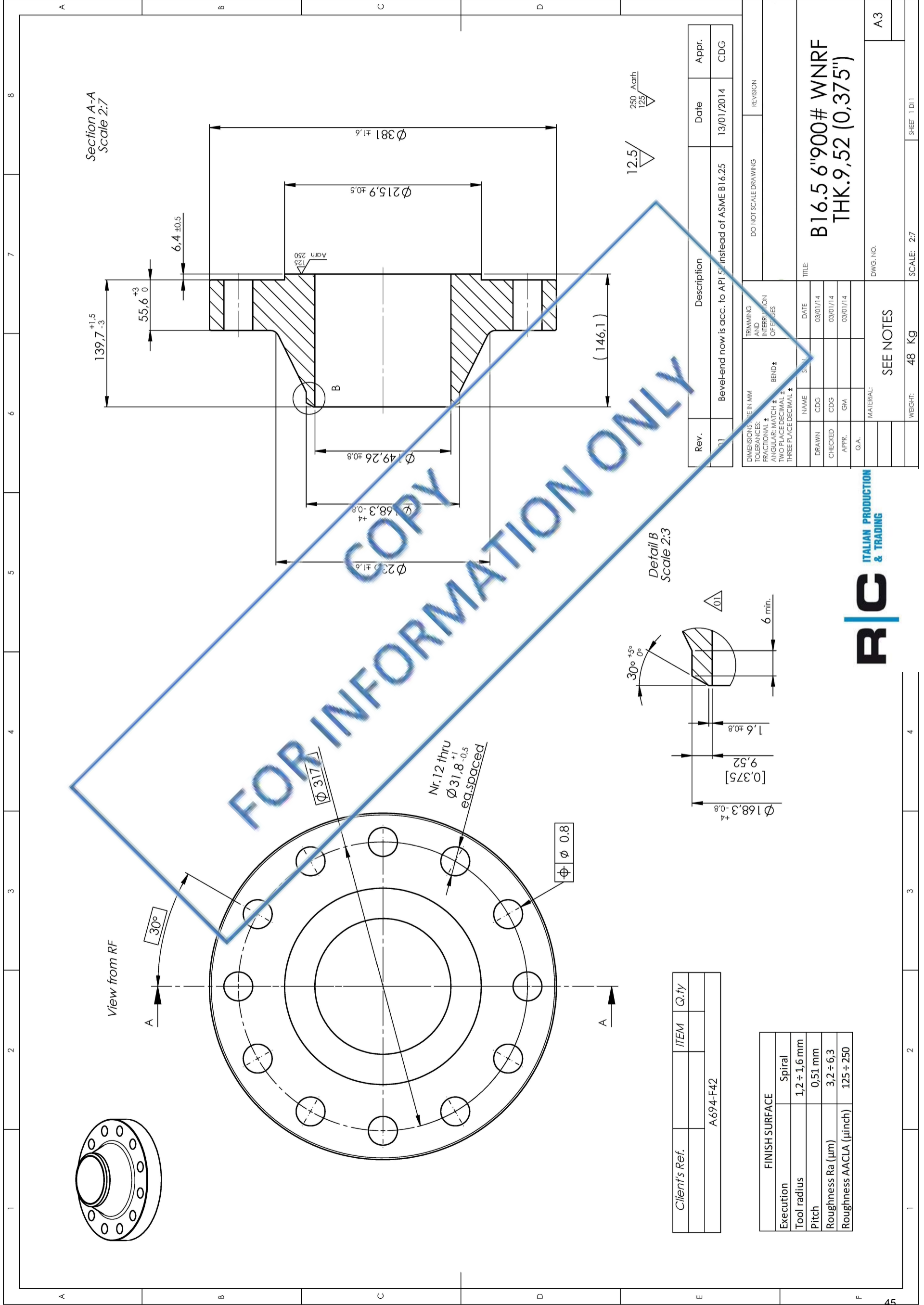
SEZ.A-A



COPY FOR INFORMATION ONLY

<b>RC</b> ITALIAN PRODUCTION & TRADING	CUSTOMER ORDER N° DISEGNO / DWG N°	DESIGNER: L. RIVAROLI	DRAWING: FLANGES ANSI 900 BL RTJ 24" B 16.5	REV. 1
	MATERIAL: A350 LF2	DATE: 13/03/2014	SHEET: 1/1	

# SAMPLE DWG WN FLANGE

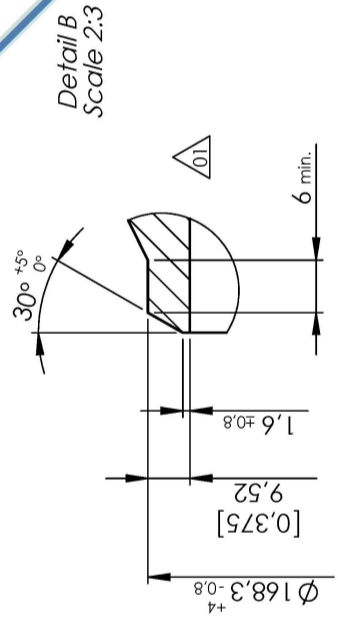


FOR INFORMATION ONLY

Rev.	Description	Date	Appr.
01	Bevel-end now is acc. to API 5L instead of ASME B16.25	13/01/2014	CDG

DO NOT SCALE DRAWING		REVISION	
DIMENSIONS: IN MM	TRIMMING AND INTERSECTION OF EDGES	NAME	DATE
TOLERANCES: FRACTIONAL: TWO PLACE DECIMAL; ANGULAR: MATCH; THREE PLACE DECIMAL	BEND ±	CDG	09/01/14
		CDG	03/01/14
		GM	03/01/14
		G.A.	

TITLE:		B16.5 6"900# WNRF THK.9,52 (0,375")	
DRAWN:		CDG	
CHECKED:		CDG	
APPR.:		GM	
G.A.:			
MATERIAL:		SEE NOTES	
DWG. NO.:		A3	
WEIGHT:		48 Kg	
SCALE:		2:7	
SHEET 1 DI 1			



Client's Ref.	ITEM	Q.ty
	A694-F42	

FINISH SURFACE	
Execution	Spiral
Tool radius	1,2 ÷ 1,6 mm
Pitch	0,51 mm
Roughness Ra (µm)	3,2 ÷ 6,3
Roughness AACLA (µinch)	125 ÷ 250

**R/C** ITALIAN PRODUCTION & TRADING

# SAMPLE DWG SWIVEL FLANGE

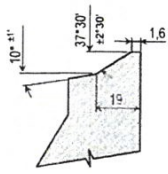
CUSTOMER \_\_\_\_\_

ORDER \_\_\_\_\_

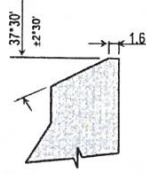
STANDARDIZATION FLANGE DESIGN IN ACCORDANCE WITH ASME VIII DIV.2

FLANGE 16" 600 SWIVEL RING

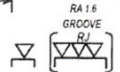
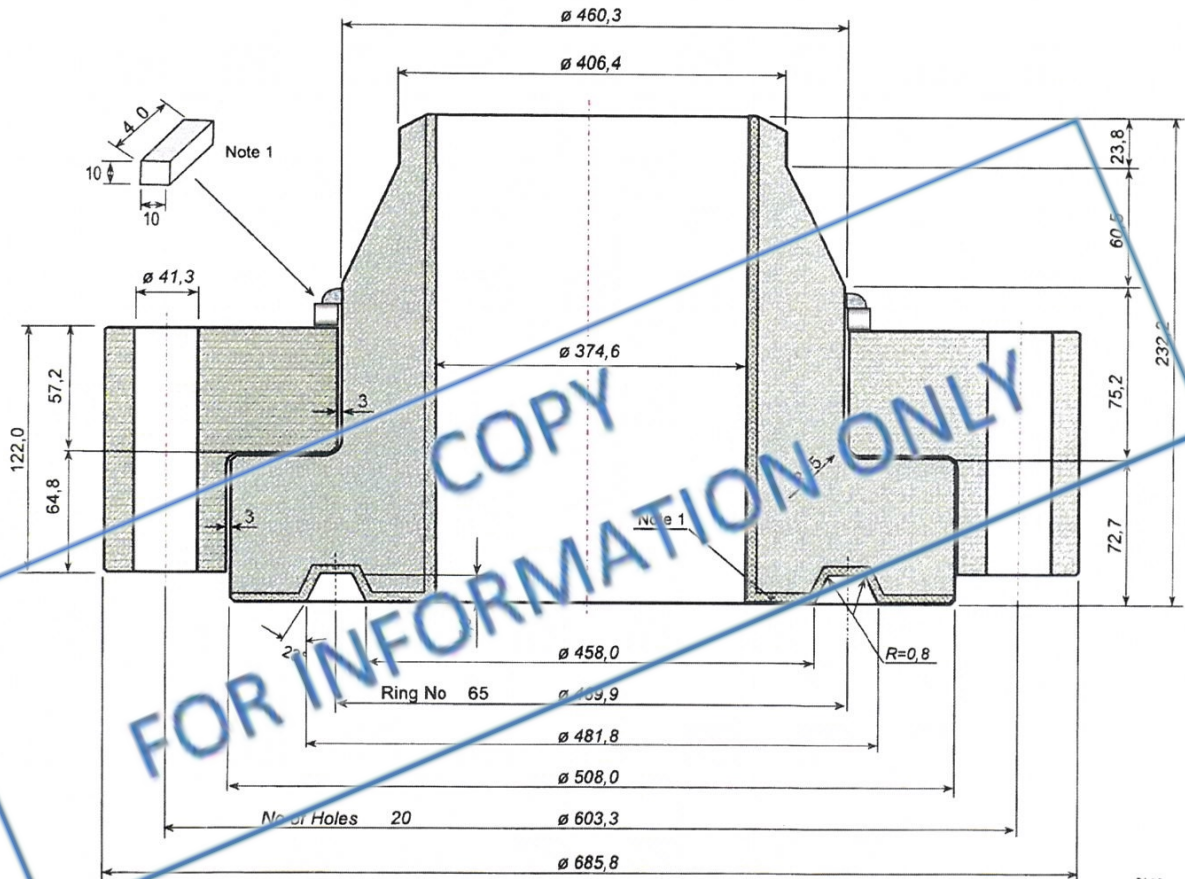
ITEM \_\_\_\_\_ Q.TY. \_\_\_\_\_



Bevel for Wall Thickness Greater than 0,88"



Bevel for Wall Thickness From 0,19" to 0,88"



Marking 16" WT=15,88 600 R65 A694/F52 (HEAT)

Material ASTM A694/F52

Note

- 1) No. 10 Welded Retaining lugs long 40mm equispaced between bolt holes
- 2) Cladding 3mm the ring groove, raised face and bore
- 3) Approximate weight 252,1Kg

All dimensions are in "mm" Tolerance in accordance to ASME B16.5

**R/C** ITALIAN PRODUCTION  
& TRADING

**SAMPLE DWG**

# SAMPLE OF SWIVEL FLANGE CALCULATION

## Operating/Hydrotest

<b>SWIVEL RING FLANGE DESIGN</b> FLANGE DESIGN IN ACCORDANCE WITH ASME VIII DIV.2		Customer	ITEM
		Order	Rev. 2
		Date 26/08/14	Sheet 1 of 2
		Operating conditions:	Design
Flange Size	16 "	Operating pressure Pd (Mpa)=	9,1
Flange rating	600	External Bending Moment Mb (kNm)=	139
Pipe diameter (mm)	406,4	External Axial Force F (kN)=	34
Wall thickness (mm)	15,88	Equivalent Pressure Peq (Mpa)=	16,12
Corrosion allowance c.a (mm)	0	Design temperature (°C)	80
Flange material	A694/F52	Extend of the overlay weld	The ring groove, raiser face and bore
Overlay thickness (mm)	3,0	Overlay weld metal	Alloy 625
			Hydrotest
			12,80
			0
			0
			12,80
			Ambient

Bolting material properties:		ALLOWABLE STRESSES (Mpa)	
Diameter	1,50 "	Flange	
Root bolt diameter	34,2	Design temp Sfo	189,6
Number of bolts	20	Atm . temp. Sfa	189,6
Material Grade	ASTM A193-B7	Bolting	
Yield Strength - Sy	724,0	Design temp Sb	172,0
		Atm . temp. Sa	172,0
		Flange modulus of elasticity at design temperature Eo (Mpa)	202860
		Flange modulus of elasticity at atmospheric temperature Ea (Mpa)	206200

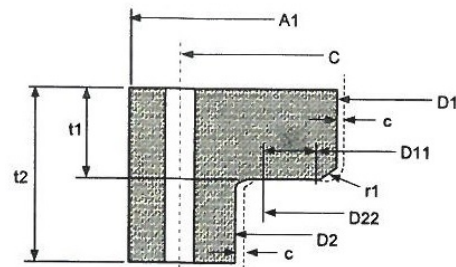
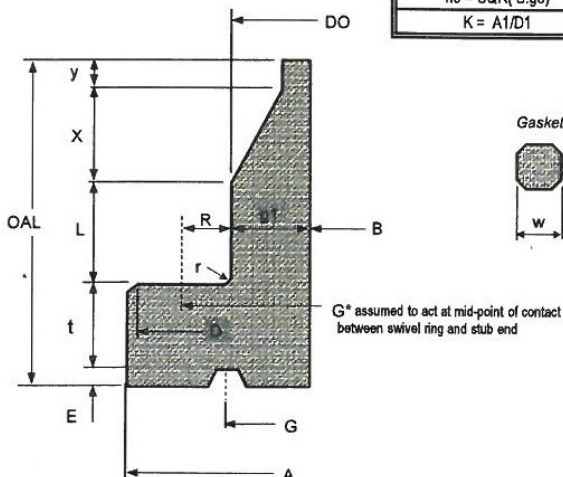
GEOMETRY			
A (mm)	508,0	A1 mm	685,8
D (mm)	502,0	OAL (mm)	232,2
B (mm) "with corrosion"	374,64	E (mm)	7,9
t (mm)	64,8	R (mm)	13,4
g1 (mm) "with corrosion"	42,83	t1 (mm)	5,2
DO (mm)	460,3	t2 (mm)	121,9
L (mm)	75,2	D1 (mm)	466,3
x (mm)	60,5	D2 (mm)	514,0
y (mm)	23,8	G* (mm)	603,3
		Clearance C (mm)	3,0
		Slope(°)	24
		r (mm)	5,0
		r1 (mm)	5,0
		D11 (mm)	476,3
		D22 (mm)	498,0
		N, contact width (mm)	10,3
			4,0

Gasket RJ N°		REQUIRED BOLTING AREA	
Gasket material	Soft iron	Design Wm1=2.b.pi.G*.P (N)	363584
w (mm)	12,11	Design H=0,75.G*.P (N)	2795975
bD=w/B=b (mm)	1,39	Design Wm1=Hp + H (N)	3159559
G (mm)	469,9	Hydrotest Hp=2.b.pi.G.m.P (N)	280007
y (Mpa)	124	Hydrotest H=G*.pi.P/4 (N)	221784
	5,5	Hydrotest Wm1= Hp + H (N)	250811
		Wm1= b.pi.G* (N)	254440
		Wm1 greater than (m.Sa + Wm1/Sb (mm²))	18370
		Ab (mm²)	15033,3
		W = (Am + Ab).Sa/2	3160745
		Ab >= Am	yes

Operating MOMENT CALCULATION			
HD = 0,785.B².P (N)	1777259	hD = R + .5.g1 (mm)	34,84
HG = Wm1 - H (N)	363584	hG = 0,5.(G*-G) (mm)	8,63
HT = H - HD (N)	1018716	T = 0,5.R + g1 + hG (mm)	32,44
Bolt utilization factor = (Wm1/Ab)/Sybolt	23,74%	MD = HD.hD (N mm)	61919699
		MG = HG.hG (N mm)	3135911
		MT = HT.hT (N mm)	33047153
		Mo (N mm)	98102764

Hydrotest			
HD = pi.B².P/4 (N)	1411104	hD = R + .5.g1 (mm)	34,84
HG = Wm1 - H (N)	288657	hG = 0,5.(G*-G) (mm)	8,63
HT = H - HD (N)	808780	hT = 0,5.R + g1 + hG (mm)	32,44
Bolt utilization factor = (Wm1/Ab)/Sybolt	18,85%	MD = HD.hD (N mm)	49159368
		MG = HG.hG (N mm)	2489666
		MT = HT.hT (N mm)	26236838
		Mo (N mm)	77885672

Seating		HUB AND STRESS FORMULA FACTORS	
HG = W (N)	3160745	K = A/B	1,36
hG = 0,5.(G*-G) (mm)	8,63	T	1,77
Mo' (N mm)	27261427	Z	3,38
Bolt utilization factor = (W/Ab)/Sybolt	23,75%	Y	6,53
		U	7,18
		g1/go	1,00
		ho = SQR(B.go)	126,67
		K = A1/D1	1,47
		F	0,909
		V	0,550
		f	1,00
		e = F / ho	0,00718
		L = (te+1)/T + 13/d	0,92
		d = (U / V) . ho.go²	3033717,11
		Y1	5,20





### STRESS CALCULATIONS

OPERATING - HYDROTEST					SEATING		
Formula	Design		Hydrotest		Formula	Allowable Stress (Mpa)	Actual Stress (Mpa)
Longitudinal hub SH=fMo/L.g <sup>1.2</sup> .B	(1,5 . Sfo)	155,91	(1,5 . Sfa)	123,78	Longitudinal hub SH=fMo/L.g <sup>1.2</sup> .B	(1,5 . Sfa )	43,33
Radial flange SR=(1,33t.e+1)Mo/L.t <sup>2</sup> .B	( Sfo )	110,32	(1,35Sfa )	87,68	Radial flange SR=(1,33t.e+1)Mo/L.t <sup>2</sup> .B	( Sfa )	30,66
Tangential flange ST=Y.Mo/ t <sup>2</sup> .B - Z.SR	( Sfo )	34,47	(1,35Sfa )	27,36	Tangential flange ST=Y.Mo/ t <sup>2</sup> .B - Z.SR	( Sfa )	9,58
greater of .5(SH+SR) or .5(SH+ST)	( Sfo )	133,1	(1,35Sfa )	75,6	greater of .5(SH+SR) or .5(SH+ST)	( Sfa )	37,0
Bearing stress Wm1/(pi(D22 <sup>2</sup> -D11 <sup>2</sup> )/4)	(1,5 . Sfo)	190,3	(1,5 . Sfa)	151,1	Bearing stress Wm1/(pi(D22 <sup>2</sup> -D11 <sup>2</sup> )/4)	(1,5 . Sfa )	190,3

### UTILIZATION FACTOR

OPERATING - HYDROTEST					SEATING		
Formula	Actual stres (Mpa)		Design	Hydrotest	Formula	Actual stres (Mpa)	UF
Longitudinal hub SH=fMo/L.g <sup>1.2</sup> .B	155,91	123,78	0,55	0,44	Longitudinal hub SH=fMo/L.g <sup>1.2</sup> .B	43,33	0,15
Radial flange SR=(1,33t.e+1)Mo/L.t <sup>2</sup> .B	110,32	87,68	0,58	0,34	Radial flange SR=(1,33t.e+1)Mo/L.t <sup>2</sup> .B	30,66	0,16
Tangential flange ST=Y.Mo/ t <sup>2</sup> .B - Z.SR	34,47	27,36	0,18	0,11	Tangential flange ST=Y.Mo/ t <sup>2</sup> .B - Z.SR	9,58	0,05
greater of .5(SH+SR) or .5(SH+ST)	133,11	75,57	0,70	0,30	greater of .5(SH+SR) or .5(SH+ST)	36,99	0,26
Bearing stress Wm1/(pi(D22 <sup>2</sup> -D11 <sup>2</sup> )/4)	190,28	151,06	0,57	0,44	Bearing stress Wm1/(pi(D22 <sup>2</sup> -D11 <sup>2</sup> )/4)	190,35	0,67

### MOMENT CALCULATION (N.M)

#### Operating

HD = pi.D1 <sup>2</sup> .P/4 (N)	2753298	hD = 0,5.(C-D1) (mm)	68,5	MG = HD.hD (N mm)	188600919,8
HG = Wm1 - H (N)	363584	hG = 0,5.(C-G*) (mm)	58,075	MG = HG.hG (N mm)	21115137,13
HT = H - HD (N)	42677	hT = 0,5.(C-G*) (mm)	58,075	MT = HT.hT (N mm)	2478464,827
				Mo (N mm)	212194521,8

#### Hydrotest

HD = pi.D1 <sup>2</sup> .P/4 (N)	2185902	hD = 0,5.(C-D1) (mm)	68,5	MD = HD.hD (N mm)	149734253,9
HG = Wm1 - H (N)	288657	hG = 0,5.(C-G*) (mm)	58,075	MG = HG.hG (N mm)	16763753,37
HT = H - HD (N)	33883	hT = 0,5.(C-G*) (mm)	58,075	MT = HT.hT (N mm)	1967732,398
				Mo (N mm)	168465739,7

#### Seating

HG = W (N)	3160745	hG = 0,5.(C-G*) (mm)	58,08	Mo' (N mm)	183560275
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### RING STRESS CALCULATIONS

Formula	Design		Hydrotest		Formula	Seating	
Tangential ST=Y1.Mo/ t <sup>2</sup> .D1	( Sfo )	159,3	(1,35 . Sfa)	126,5	Tangential ST=Y1.Mo/ t <sup>2</sup> .D1	( Sfa )	137,8
Shear She=Wm1/pi.t1.D2	(0,5 . Sfo)	34,24	(0,5 . Sfo)	27,18	Shear She=Wm1/pi.t1.D2	(0,5 . Sfo)	34,25

### UTILIZATION FACTOR

OPERATING - HYDROTEST				SEATING			
Formula	Actual stres (Mpa)		U.F.		Formula	Actual stres (Mpa)	U.F.
Tangential ST=Y1.Mo/ t <sup>2</sup> .D1	159,3	126,5	0,84	0,49	Tangential ST=Y1.Mo/ t <sup>2</sup> .D1	137,8	0,73
Shear She=Wm1/pi.t1.D2	34,24	27	0,36	0,29	Shear She=Wm1/pi.t1.D2	34,2	0,36

# NDT LABORATORY

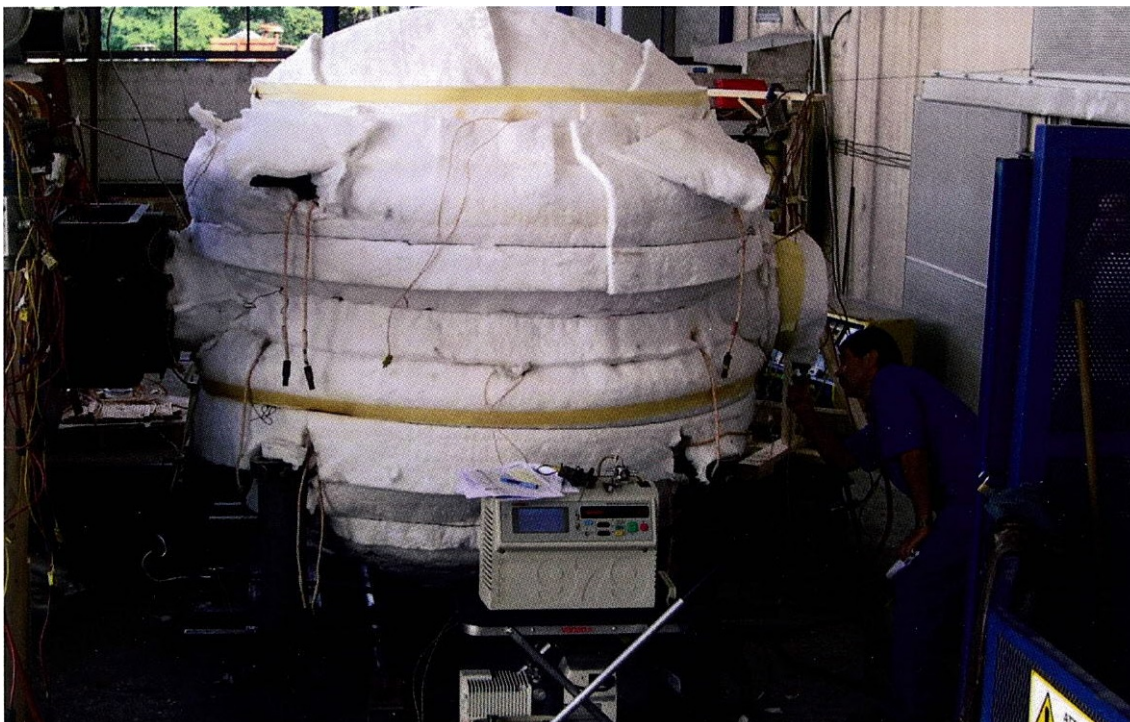


- RADIOGRAPHIC TEST
- ULTRASONIC TEST
- MAGNETIC TEST
- PENETRANT TEST
- LEAK TEST
- PRESSURES TEST
- CRYOGENIC TEST
- PERSONNEL QUALIFICATION

# *NDT LABORATORY*

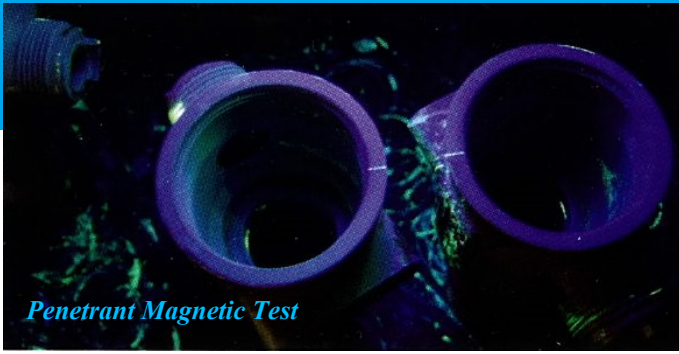
All NDT personnel is qualified in accordance with all international standards as ASNT-TC-1A; (EN 473) ISO9712, CP 189

- **(RT) RADIOGRAPHIC TEST**
- **(UT) ULTRASONIC TEST**
- **(MT) MAGNETIC TEST**
- **(PT) PENETRANT TEST**
- **(VT) VISUAL TEST**
- **(LT) LEAK TEST**
- **(PT) PRESSURES TEST**
- **(CT) CRYOGENIC TEST**

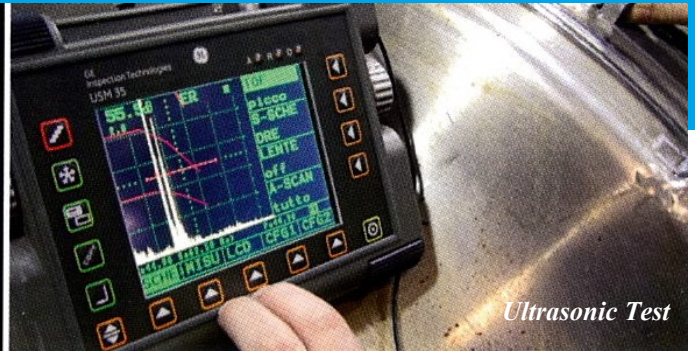


*Prototype Test with Hot and Cryogenic Test*

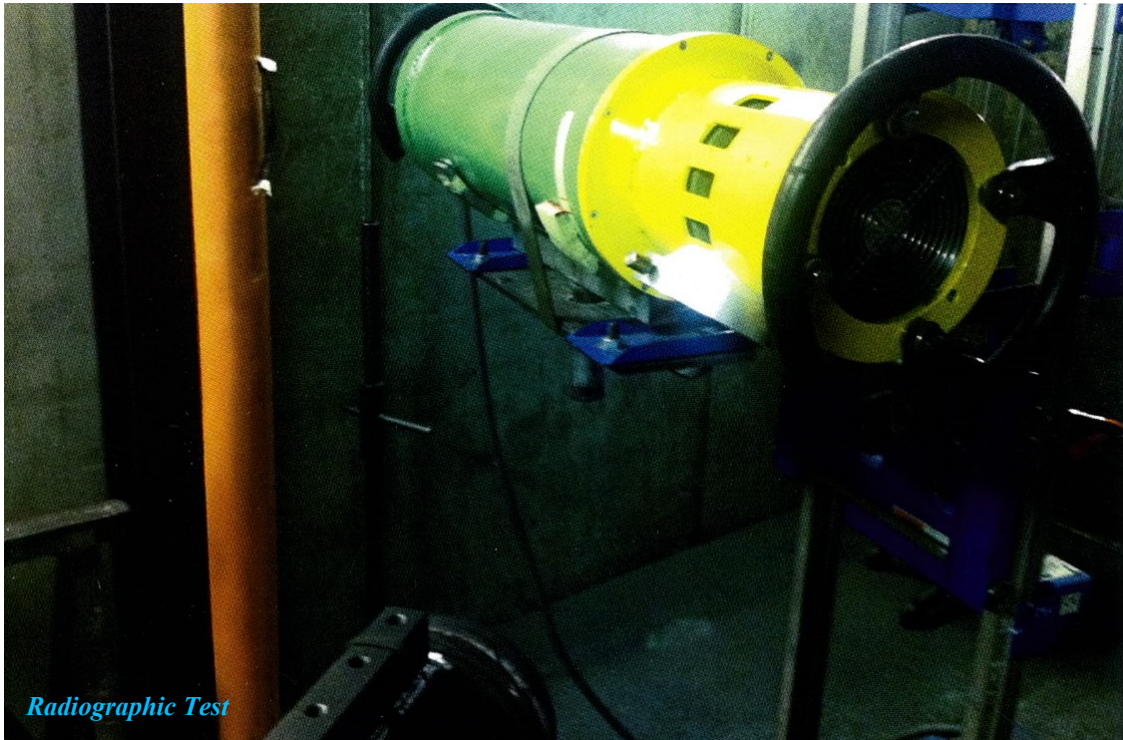
# NDT LABORATORY



*Penetrant Magnetic Test*



*Ultrasonic Test*



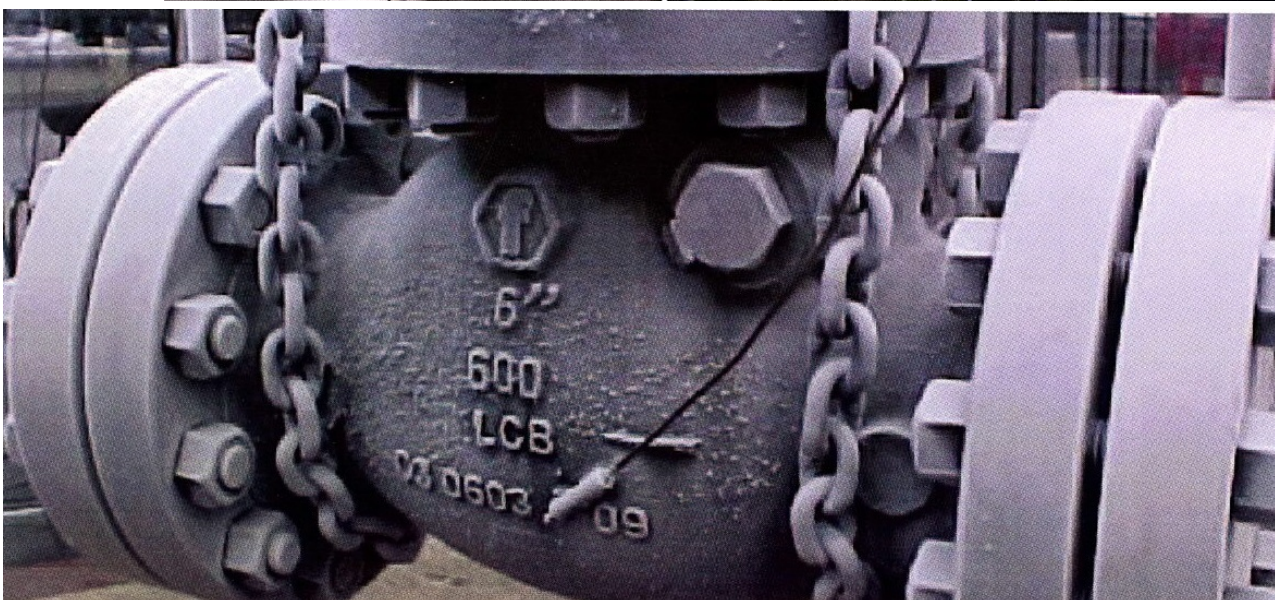
*Radiographic Test*



*PMI Field  
chemical analysis*



*Cryogenic Test*





Fittings, Forgings,  
Flanges, Valves & Pipes



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